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CLAIMS:

1. A method of forming a patterned conductive element for an implantable medical device, the method comprising the steps of:

5 (i) depositing a supplementary material on a sheet of conductive, parent material to form a sheet of composite material;

(ii) applying a carrier material over the supplementary material of the composite sheet to form a sheet of semi-finished material;

10 (iii) removing portions from at least the conductive parent material of the sheet of semi-finished material in accordance with a desired pattern corresponding to a patterned conductive element to be formed; and

(iv) releasing at least the carrier material from the sheet of semi-finished material.

2. A method according to claim 1, wherein the step of applying the carrier material to form the sheet of semi-finished material comprises co-rolling.

3. A method according to claim 1 or claim 2, wherein the conductive parent material is biocompatible.

20 4. A method according to claim 3, wherein the conductive parent material is platinum.

5. A method according to claim 3, wherein the conductive parent material is platinum/iridium.

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6. A method according to any one of the preceding claims, wherein the conductive parent material of the sheet of semi-finished material is no greater than 2mm thick before the co-rolling step.

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7. A method according to claim 6, wherein the conductive parent material of the sheet of semi-finished material is no greater than 400µm thick before the co-rolling step.

8. A method according to claim 7, wherein the conductive parent material of the sheet of semi-finished material is no greater than 200µm thick before the co-rolling step.

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9. A method according to claim 8, wherein the conductive parent material of the sheet of semi-finished material is no greater than 150 μ m thick after the co-rolling step.

5 10. A method according to claim 9, wherein the conductive parent material of the sheet of semi-finished material is no greater than 50 μ m thick after the co-rolling step.

11. A method according to any one of the preceding claims, wherein the supplementary material is selected from any one of the group consisting of TiN, Ta, Nb,
10 Ni and Ir.

12. A method according to any one of the preceding claims wherein the carrier material is conductive.

15 13. A method according to claim 12, wherein the carrier material is copper or steel.

14. A method according to any one of the preceding claims, wherein the removing step is performed by micro-machining.

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15. A method according to claim 14, wherein the micromachining includes any one selected from the group consisting of EDM, milling and cutting.

16. A method according to any one of the preceding claims, further comprising the
25 step of coating the patterned parent material with a layer of resiliently flexible material before the releasing step.

17. A method according to any one of the preceding claims, wherein the releasing step is by dissolution.

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18. A method according to any one of the preceding claims, wherein the patterned element of parent material after the releasing step, is at least 99.95% pure.

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19. A method of making a sheet of semi-finished material, the method comprising the steps of:

depositing a supplementary material on a platinum sheet to form a composite sheet;
and

5 applying a carrier material over the supplementary material, to form a sheet of semi-finished material;

wherein the platinum sheet on the sheet of semi-finished material has a thickness being no greater than 100 μ m.

10 20. A method according to claim 19, wherein the platinum sheet on the semi-finished material has a thickness no greater than 40 μ m

21. A method according to claim 19 or 20, wherein the semi-finished material is no greater than 1000 μ m thick.

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22. A method according to claim 19, wherein the semi-finished material is no greater than 200 μ m thick.

23. A method according any one of claims 17 to 20, wherein the supplementary
20 material is any one selected from the group consisting of TiN, Ta, Nb and Ir.

24. A method according to any one of claims 17 to 21, wherein the carrier material is conductive.

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25. A method according to claim 22, wherein the carrier material is copper or steel.

26. A method according to any one of claims 17 to 19, wherein the platinum sheet on the semi-finished material is at least 99.95% pure.

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27. A method of forming an electrode array for an implantable medical device, the method comprising the steps of:

(i) preparing a semi-finished sheet by depositing a supplementary material on a platinum sheet and then applying a carrier material over the supplementary material;

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(ii) removing portions from at least the platinum sheet in accordance with a predetermined pattern, the pattern including a linear array of stimulating or recording pads and at least one electrical conduction means extending away from each one of the pads to a location distal from the pad; and

5 (iii) releasing the carrier material.

28. A method according to claim 27, wherein the electrical conduction means each have an average width of less than 100µm.

10 29. A method according to claim 28, wherein each stimulating or recording pad has an area of less than 0.5mm².

30. A method according to claim 29, wherein each electrical conduction means is electrically insulated from its neighbour, the spacing between neighbouring wires being
15 less than 100µm.

31. A method according to claim 30, further comprising the step of coating the platinum sheet with a layer of resiliently flexible material before the releasing step.

20 32. A method according to claim 31, wherein the step of applying the carrier material comprises co-rolling.

33. A method according to claim 32, wherein the supplementary material is any one selected from the group consisting of TiN, Ta, Nb, Ni and Ir.

25 34. A method according to claim 33, wherein the carrier material is conductive.

35. A method according to claim 34, wherein the carrier material is copper or steel.

30 36. A method according to claim 35, wherein the removing step is performed by any one selected from the group consisting of EDM, milling and cutting.

37. A method according to claim 36, wherein the releasing step is by dissolution.

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38. A method according to claim 37, wherein the platinum sheet is at least 99.95% pure.